

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 through 48 (Cancelled).

49. (Previously Presented) A fluid removal apparatus comprising:

a blood removal catheter for insertion into a peripheral vein or artery and having a size 16 standard gage needle or less;

a filter having a blood inlet port coupled to the blood removal catheter, a blood outlet port, an excess fluid removal port, and a blood flow passage with porous membrane which passes fluids to the fluid removal port and retains solutes of 50,000 Daltons or greater, and

a blood return catheter for inserting into a peripheral vein or artery and having a size of 16 standard gage needle or less.

50. (Previously Presented) An apparatus as in claim 49 further comprising a blood pump coupled to pump blood into the filter.

51. (Previously Presented) An apparatus as in claim 49 further comprising a valve coupled to the excess fluid removal port of the filter, and the valve cyclically switched to turn on and off flow of the excess fluid from the filter.

52. (Previously Presented) An apparatus as in claim 49 wherein the filter includes capillary, hollow fibers.

53. (Previously Presented) An apparatus as in claim 49 wherein the hollow fibers have filtering pores which retain in the blood solutes greater than 50,000 Daltons.
54. (Previously Presented) An apparatus as in claim 49 wherein the hollow fibers have blood passages of approximately 0.2 mm or less in diameter.
55. (New) A method for filtering blood comprising:
withdrawing blood from an adult patient;
filtering the withdrawn blood in a filter having an active filter membrane surface of no greater than 0.2 meters (m^2) squared to remove filtrate from the blood, and
infusing treated blood into the adult patient.
56. (New) A method as in claim 55 wherein the active filter membrane surface is no greater than 0.2 m^2 .
57. (New) A method as in claim 55 further comprising removing the filtrate at a rate no greater than one liter per hour.
58. (New) A method as in claim 55 further comprising withdrawing the blood in a range of 10 to 60 milliliters per minute.
59. (New) A method as in claim 55 further comprising passing the blood through a blood circuit comprising the filter during a residence time period of no greater than 120 seconds.
60. (New) A method as in claim 55 further comprising passing the blood through filter fibers having a length of at least 20 centimeters.

61. (New) A method as in claim 55 further comprising passing the blood through a bundle of filter fibers having at least 620 fibers.

62. (New) A method as in claim 55 wherein said filter has a length of at least 20 cm and an internal diameter of no greater than 1.5 cm.

63. (New) A method as in claim 55 further comprising a shear rate of blood flowing through the filter of at least 1000 per second.

64. (New) A filter for an extracorporeal blood circuit having an input for blood withdrawn from a human patient and a blood output for filtered blood to be infused into the patient, said filter comprising:

a filter body having a length of at least 20 centimeters (cm) and an interior diameter of no greater than 1.5 cm;

an input at a first end of the body to receive the withdrawn blood;

an output at a second end of the body to discharge the filtered blood;

a filter membrane in the body defining a blood passage through the body, wherein the membrane has an active filter membrane surface area of no greater than 0.2 meters squared (m^2), and

a filtrate output to the body and open to a side of the filter surface area opposite to the blood passage.

65. (New) A filter as in claim 64 wherein the active filter membrane surface area is no greater than $0.1 m^2$.

66. (New) A method as in claim 64 wherein a volume of the blood passage in the filter is less than two percent of a cardiac output of an adult.

67. (New) A method as in claim 64 wherein the filter membrane surface is an interior surface of a bundle of filter fibers.

68. (New) A method as in claim 67 wherein the filter fibers have a length of at least 20 centimeters.

69. (New) A method as in claim 67 wherein the bundle of filter fibers has at least 620 fibers.